CLAIMS

1. A method of producing an active matrix display device having an optical layer (7,9,11) comprising a mixture of an electro-optical material and a polymer precursor, the method comprising:

producing an active plate comprising a substrate (60) carrying an array of pixel circuits, each pixel circuit comprising a thin film transistor (32), wherein the active plate comprises a plurality of thin film layers (30,62,64,66,52) defining the transistors, and wherein an upper surface (50) of the active plate comprises an array of wells (70) such that the upper surface has higher (72) and lower regions;

providing the optical layer mixture of an electro-optical material and a polymer precursor over the active plate; and

exposing the optical layer to a stimulus for polymerizing the polymer precursor into a discrete polymer surface layer (9), thereby enclosing the electro-optical material between the polymerized material and the active plate to define display pixels, and wherein enclosed bodies of electro-optical material defining display pixels are provided over the lower regions.

2. A method as claimed in claim 1, wherein the array of wells is defined by a passivation layer (50) forming part of the top of the active plate.

3. A method as claimed in claim 2, wherein the passivation layer (50) comprises silicon nitride.

4. A method as claimed in claim 3, wherein the thickness of the silicon nitride layer (50) is 0.5 – 1.5 micrometers, and the wells are formed by at least partial removal of the silicon nitride layer.

5. A method as claimed in any preceding claim, further comprising, after producing the active plate, coating the higher regions (72) with an increased affinity layer (74) for providing an increased affinity for the polymerizable

material of the optical layer, and wherein exposing the optical layer to a stimulus also forms side layers (11) over the increased affinity layer (74).

6. A method as claimed in claim 5, wherein the coating method comprises stamping the increased affinity layer onto the active plate.

7. A method as claimed in claim 6, wherein the stamping is carried out using a non-patterned stamp.

8. A method as claimed in claim 6, wherein the stamping is carried out using a patterned stamp (80).

9. A method as claimed in claim 5, 6, 7 or 8, wherein the high affinity layer (74) comprises a layer functionalized with chemically reactive groups.

10. A method as claimed in claim 2, 3, or 4, wherein the display pixel cells are enclosed by the passivation layer (50) side walls, the active plate and the polymer surface layer (9).

11. A method as claimed in claim 2, 3, or 4, wherein the array of wells (50) is further defined into a photoresist layer (90) on top of the passivation layer (50).

12. A method as claimed in claim 11, wherein the display pixel cells are enclosed by the passivation layer (50) side walls, the active plate, the polymer surface layer (9) and the photoresist layer.

13. A method as claimed in claim 11 or 12, wherein the thickness of the resist layer (90) is 5 – 15 micrometers.

14. A method as claimed in claim 11, 12 or 13, wherein the resist layer (90) comprises a material for providing an increased affinity for the polymerizable material of the optical layer.

15. A method as claimed in any preceding claim, further comprising applying a liquid crystal alignment layer over the active plate.

16. A method as claimed in claim 15, wherein the alignment layer is applied by spincoating.

17. A method as claimed in claim 15, wherein the alignment layer is applied by printing.

18. A method as claimed in any preceding claim, wherein the electro-optical material comprises a liquid crystal material.

19. An active matrix display device having an optical layer comprising a mixture of an electro-optical material and a polymer precursor, comprising:

an active plate comprising a substrate (60) carrying an array of pixel circuits, each pixel circuit comprising a thin film transistor (32), wherein the active plate comprises a plurality of thin film layers (62,64,66,52,30) defining the transistors, and wherein an upper surface of the active plate comprises a passivation layer (50) in which is defined an array of wells (70) such that the upper surface has higher (72) and lower regions; and

an array of display pixels comprising electro-optical material enclosed between polymerized material (9,11) of the mixture and the active plate, and wherein enclosed bodies of electro-optical material defining display pixels are provided over the lower regions.

20. A device as claimed in claim 19, wherein the passivation layer (50) comprises silicon nitride.

21. A device as claimed in claim 20, wherein the thickness of the silicon nitride layer (50) is 0.5 – 1.5 micrometers, and the wells (70) comprise at least partially removed areas of the silicon nitride layer.

22. A device as claimed in any one of claims 19 to 21, wherein the higher regions (72) are coated with an increased affinity layer (74) for providing an increased affinity for the polymerizable material of the optical layer, and wherein the polymerized material defines side layers (11) over the increased affinity layer (74).

23. A device as claimed in claim 22, wherein the high affinity layer (74) comprises a layer functionalized with chemically reactive groups.

24. A device as claimed in any one of claims 19 to 21, wherein the display pixel cells are enclosed by the passivation layer (50) side walls, the active plate and the polymer surface layer (9).

25. A device as claimed in any one of claims 19 to 21, wherein the upper surface of the active plate further comprises a photoresist layer (90) on top of the passivation layer (50).

26. A device as claimed in claim 25, wherein the display pixel cells are enclosed by the passivation layer (50) side walls, the active plate, the polymer surface layer (9) and the photoresist layer (90).

27. A device as claimed in claim 25 or 26, wherein the thickness of the resist layer (90) is 5 – 15 micrometers.

28. A device as claimed in claim 25, 26 or 27, wherein the resist layer (90) comprises a material for providing an increased affinity for the polymerizable material of the optical layer.

29. A device as claimed in any one of claims 19 to 28, further comprising a liquid crystal alignment layer over the active plate.

30. A device as claimed in any one of claims 19 to 29, wherein the electro-optical material comprises a liquid crystal material.